

**What Is Claimed Is:**

1. A plane beam generating apparatus using a cylindrical prism, comprising:

- 5 a hollow cylindrical prism with a predetermined diameter; and  
a laser beam generator for emitting a laser beam to the outer surface of the cylindrical prism,

wherein the laser beam generator is arranged such that the laser beam generated by the laser beam generator is incident on the outer surface of the cylindrical prism, perpendicularly to the central axis of the cylindrical prism, a part of the laser beam incident on the cylindrical prism is reflected from the outer surface of the cylindrical prism, and the remaining part of the laser beam is repeatedly reflected from the outer surface and the inner face of the cylindrical prism and repeatedly transmitted through the cylindrical prism, to generate a plane beam propagated in all directions of 360° on an arbitrary plane in the radius direction of the cylindrical prism.

10  
15

2. The plane beam generating apparatus as claimed in claim 1, wherein the outer surface of the cylindrical prism is coated such that reflectances R1 and R2 respectively become 5% to 90% when the laser beam incident on the cylindrical prism is a P-polarized beam, an S-polarized beam or a non-polarized beam (R1 is a reflectance when an incident angle of the laser beam to an incident surface is zero, and R2 is a reflectance when the incident angle is Brewster angle (56°)).

20

25

3. The plane beam generating apparatus as claimed in claim 1, wherein R1 and R2 are respectively 40% to 50% and 20% to 30% when the laser beam incident on the cylindrical prism is a P-polarized beam, R1 and R2 are respectively 30% to 50% and 40% to 70% when the laser beam incident on the

cylindrical prism is an S-polarized beam, R1 and R2 are respectively 40% to 50% when the laser beam incident on the cylindrical prism is a non-polarized beam.

4. The plane beam generating apparatus as claimed in claim 1,  
5 wherein the laser beam generated by the laser beam generator has a predetermined width corresponding to 5% to 100% of the diameter of the outer surface of the cylindrical prism.

5. A conical beam generating apparatus using a cylindrical prism,  
10 comprising:  
a cylindrical prism having a predetermined diameter; and  
a laser beam generator for emitting a laser beam to the outer surface of the cylindrical prism,

wherein the laser beam generator is arranged such that the laser beam  
15 emitted from the laser beam generator is incident on the outer surface of the cylindrical prism at a predetermined angle of the central axis of the cylindrical prism, a part of the laser beam incident on the cylindrical prism is reflected from the outer surface of the cylindrical prism to be propagated in a cylindrical form, and the remaining part of the laser beam is transmitted through the cylindrical  
20 prism to be propagated in a conical form, to generate a conical beam.

6. The conical beam generating apparatus as claimed in claim 5,  
wherein the laser beam generated by the laser beam generator has a predetermined width corresponding to 5% to 100% of the diameter of the outer  
25 surface of the cylindrical prism.

7. A security system using a cylindrical prism, comprising:  
a plane beam generator using a hollow cylindrical prism with a predetermined diameter;

a signal detector 1240 located having a predetermined distance from the plane beam generator and detects a plane beam generated by the plane beam generator;

5 a central processing unit 1260 for judging whether there is an intrusion from a signal detected by the signal detector; and

an output unit 1270 for outputting the judgement result of the central processing unit.

8. A security system using a cylindrical prism, comprising:

10 a plane beam generator using a hollow cylindrical prism with a predetermined diameter;

a reflector 1230 for reflecting a plane beam generated by the plane beam generator;

a signal detector 1240 for detecting a beam reflected from the reflector;

15 a central processing unit 1260 for judging whether there is an intrusion from a signal detected by the signal detector; and

an output unit 1270 for outputting the judgement result of the central processing unit.

20 9. A security system in which a plurality of security systems are respectively arranged on a plurality of planes to detect intrusions for the plurality of planes, wherein each of the plurality of security systems comprises:

a plane beam generator using a hollow cylindrical prism with a predetermined diameter;

25 a reflector 1230 for reflecting a plane beam generated by the plane beam generator;

a signal detector 1240 for detecting a beam reflected from the reflector;

a central processing unit 1260 for judging whether there is an intrusion from a signal detected by the signal detector; and

an output unit 1270 for outputting the judgement result of the central processing unit.

10. The security system as claimed in claim 8 or 9, wherein the reflector includes a corner cube to generate a reflective beam that is propagated in parallel with an incident beam incident on the corner cube.

11. A security system using a cylindrical prism, comprising:  
a plane beam generating apparatus using a hollow cylindrical prism having a predetermined diameter; and

light-receiving elements for receiving a plane beam generated by the plane beam generating apparatus, the light-receiving elements are arranged in a row at one side such that they can receive the plane beam,

wherein intersecting points of the light-receiving elements and boundary lines 1301, 1302, 1303 and 1304 generated when an intruder 1300 blocks the plane beam are obtained, equations of the boundary lines are obtained from the position of the plane beam generating apparatus and the intersecting points, and positions P1, P2, P3 and P4 at which the intruder meets the boundary lines are determined to obtain information about the intruder.

20

12. The security system as claimed in claim 11, wherein the security system employs two plane beam generating apparatuses, the equations of the four boundary lines are as follows

$$< PSTYLELSPACE = 130 > y - d = \frac{d}{c - L_1} (x - c) \quad (a)$$

$$25 \quad < PSTYLELSPACE = 130 > y - d = \frac{d}{c - L_2} (x - c) \quad (b)$$

$$< PSTYLELSPACE = 130 > y - b = \frac{b}{a - M_1} (x - a) \quad (c)$$

$$< PSTYLELSPACE = 130 > y - b = \frac{b}{a - M_2} (x - a) \quad (d)$$

(here, x is a definite straight line on which the light-receiving elements are arranged, y is an imaginary straight line perpendicular to the line x, (a, b) means x and y coordinates of one of the plane beam generating apparatuses, (c, d) means x and y coordinates of the other plane beam generating apparatus, L1 and L2 are intersecting points of boundary lines generated from one of the plane beam generating apparatuses and the line x, and M1 and M2 are intersecting points of boundary lines generated from one of the plane beam generating apparatuses and the line x), and the positions at which the intruder meets the boundary lines are determined from the equations (a), (b), (c) and (d) to obtain the information about the intruder.

13. The security system as claimed in claim 11 or 12, wherein the information about the intruder includes the size, moving speed and moving direction of the intruder.

14. A security system using a cylindrical prism, comprising:  
 a conical beam generator using a cylindrical prism having a predetermined diameter;  
 a signal detector for detecting a conical beam generated by the conical beam generator;  
 a central processing unit for judging whether there is an intrusion from a signal detected by the signal detector according to whether the conical beam reaches the signal detector or not; and  
 an output unit for outputting the judgement result of the central processing unit.

15. A security system using a cylindrical prism, comprising:

a conical beam generator using a cylindrical prism having a predetermined diameter;

a signal detector for detecting a conical beam generated by the conical beam generator;

5 a beam path converting unit arranged between the conical beam generator and the signal detector and converts the path of the conical beam such that the beam is propagated to the signal detector;

a central processing unit for judging whether there is an intrusion from a signal detected by the signal detector according to whether the conical beam  
10 reaches the signal detector or not; and

an output unit for outputting the judgement result of the central processing unit.

16. The security system as claimed in claim any one of 7, 8, 14 and  
15 15, wherein the signal detector includes optical sensors, and the output unit includes an alarm generator and a display.